

SOIL SURVEY OF CHAMBERS COUNTY, ALABAMA.

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DESCRIPTION OF THE AREA.

Chambers County, Alabama, is located in the east-central portion of the State. It is bounded on the north by Randolph County, on the east by Troup and Harris counties, Georgia, on the south by Lee County, and on the west by Tallapoosa County. It is included within parallels $33^{\circ} 6' 15''$ and $32^{\circ} 4' 4''$ north latitude and meridians $86^{\circ} 45' 5''$ and $85^{\circ} 20' 1''$ west longitude. The area comprises 594 square miles or 380,160 acres.

Chambers County contains no large bodies of water. The Tallapoosa River flows through the northwest corner for a distance of 15 miles, while the Chattahoochee flows near the eastern side for 20 miles, in the last 10 miles of its course forming the boundary between Alabama and Georgia. The county is nearly a square, having a dimension of 20 miles north to south and an average length east and west of 24 miles. The highest elevation is 885 feet at a point 1 mile northwest of Buffalo. Bibby Ferry, on the Tallapoosa, and Blanton, on the Chattahoochee, each have an elevation of 500 feet, which is probably the lowest in the area. The average elevation of the county probably lies between 700 and 750 feet above sea level.

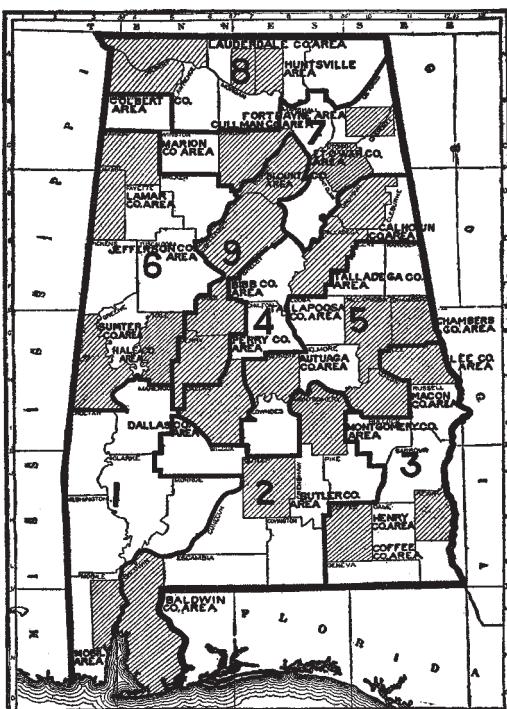


FIG. 26.—Sketch map showing location of the Chambers County area, Alabama.

This uniformity of elevation and freedom from extremes is explained by the situation of the county, which lies entirely in the southern extension of the Piedmont Plateau. The Coastal Plain region is only 10 miles farther south. The topographic features are the result of ages of denudation and weathering. In the north the surface is hilly, steep, and broken; in the south hilly to rolling, with an abundance of steep divides in all sections. In general the surface consists of a series of rounded hills, with occasional knobs and broken ridges. The intervening valleys are characteristic of mature topography, having gently sloping sides.

Profound rock movements in ancient times have tilted the rocks at all angles. The surface is now an example of the combined effect of rock movement and weathering on rocks of different hardness and resistance to weathering.

One mile northwest of Oak Bowery a sharp divide between the Chattahoochee and Tallapoosa rivers extends in a general northwest direction to a point 2 miles north of Welsh, on the Central of Georgia Railroad. Each river thus drains about one-half of the county. The south half is drained into the Chattahoochee through the following creeks: Wehadkee, Stroud, Veasey, Hardley, Wells, Oseligee, Kettem, Hill, Moores, and Osanippa. The remaining northwest half is drained by High Pine, Chikasanokee, Carlisle, Sandy, Chatahospee, County Line, and North Fork creeks. The county has no swamps and the surface drainage is uniformly good. The stream bottoms are seldom overflowed for a long period. The streams will in time become an important source of power, light, and water supply. Already the Chattahoochee furnishes power for large cotton mills in the southeastern part of the county. The Tallapoosa and smaller streams have good power sites that run gins and combination saw and feed mills.

Chambers County was created in 1832. The first settlers emigrated from Georgia and other Southern States and settled at Fredonia, Cusseta, Standing Rock, and Bethel. The public lands were sold as soon as surveys could be made. In the early days a class of wealthy slaveholders purchased large tracts of from 1,000 to 10,000 acres. The present population—36,056—is chiefly Anglo-Saxon, the descendants of early settlers, with a sufficient number of negroes to perform the farm labor.

Chambers County is well supplied with towns and railroads. There are about 75 miles of track belonging to three systems, with stations so well distributed that no section is more than 10 miles from and many sections are within a few miles of one or more shipping points. The northern and eastern parts are crossed by the Atlanta, Birmingham & Atlantic Railroad, and are within a few hours' ride

of Birmingham on the north and Atlanta on the south. The towns of Abanda, Hickory Flat, and Standing Rock are shipping points on this system. The main line of the Central of Georgia crosses the southwestern part of the county, giving direct access to Columbus and southern seaports and to Birmingham, about 120 miles north. A branch line of this system divides the county equally between the east and west. The towns of Waverly, Welsh, Stroud, Fivepoints, Buffalo, Lafayette, and Tuckersburg are on this system. The extreme eastern portion is traversed by the Chattahoochee Valley Railroad, which touches the important shipping and manufacturing points of Standing Rock, West Point, Lanett, Shawmut, and Langdale. The Western Railway of Alabama passes through Cusseta, Lanett, and West Point, and gives quick service to Montgomery and Atlanta, the latter 95 miles distant. Among other important towns not on railroads may be mentioned Fredonia, Denson, Marcoot, Oak Bowery, and Sturkie. Many residents of these towns own large farms, which they operate through negro tenants.

The county roads are not generally improved. At present they are worked by hand labor instead of horse-drawn graders such as are used on the excellent roads of Lee County adjoining. There is an abundance of good stone and other road-making material readily accessible. Rural life is rendered more pleasant by a growing telephone system, and an extensive rural free delivery gives daily mail service to nearly every farmer. The schools for both white and colored are on a graded system, and there are several excellent high schools. The farms are unusually well fenced, and the farmhouses and improvements indicate a substantial prosperity. There has been a marked improvement in this regard during the last ten years.

CLIMATE.

The climate of Chambers County is mild and equable. The long average growing season of 233 days is not only sufficient to ripen all crops, but permits the growing of two or more ordinary crops upon the same land in a single season. The lowest lying valleys may experience early fall or late spring frosts, and cotton may thus be affected, but corn and oats are seldom injured.

The following table was compiled from records of the Weather Bureau station at Opelika, in Lee County, Ala.:

Normal monthly, seasonal, and annual temperature and precipitation at Opelika, Lee County, Ala.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
December.....	°F. 47	°F. 78	°F. 9	Inches. 4.4	Inches. 1.3	Inches. 7.2	Inches. 0.6
January.....	46	74	10	4.7	6.5	3.5	0.3
February.....	46	78	- 7	5.3	3.9	10.9	1.5
Winter.....	46	.....	.....	14.4	11.7	21.6	2.4
March.....	56	88	16	5.2	2.5	6.1	Trace.
April.....	63	92	32	3.6	1.3	4.5	0.0
May.....	72	98	39	3.4	1.6	0.1	0.0
Spring.....	64	.....	.....	12.2	5.4	10.7	Trace.
June.....	78	100	49	3.8	1.9	9.9	0.0
July.....	80	101	60	5.3	5.5	4.6	0.0
August.....	79	104	58	4.4	1.4	4.0	0.0
Summer.....	79	.....	.....	13.5	8.8	18.5	0.0
September.....	74	98	46	2.8	1.9	6.2	0.0
October.....	64	94	32	3.1	1.0	8.3	Trace.
November.....	54	81	20	3.1	5.1	7.8	Trace.
Fall.....	64	.....	.....	9.0	8.0	22.3	Trace.
Year.....	63	104	- 7	49.1	33.9	73.1	2.4

Average date of first killing frost in fall, November 9; average date of last killing frost in spring, March 17.

During the winter months, with an average temperature of 46° F., the daily temperatures may vary from 50° to 60° F. during the day, with a drop to 35° or 45° F. at night. This condition usually gives occasional frosts followed by several days of clear weather. Then may follow a rain terminating in a light freeze or a flurry of quickly disappearing snow. On only two occasions in recent years has the temperature exceeded 100° F. in summer. On rare occasions it may go as low as 10° above zero in the winter. The summer heat is continuous but not extreme, being tempered by breezes and cool nights. The average annual temperature is 63° F.

The rainfall averages 49 inches. In the driest year ever recorded there was sufficient rainfall to prevent a total crop failure. Nearly one-third of the rain occurs in winter. March, April, and May are well supplied with rains. During these months the spring seeding is

completed. September, October, and November, fortunately for the gathering of crops, especially cotton, are the driest, though an occasional wet fall may discolor the cotton, especially on the red soils.

The prevailing winds are from the south and west. During the summer there are usually thunder storms or general rains coming from the south or southwest. Tornadoes are unknown, although there may be occasional high winds, doing little damage. There is a marked absence of damp, foggy mornings, and the percentage of sunshine at all seasons is high.

Water for domestic and commercial use is pure, abundant, and easily obtained. Stagnant bodies of water are rare, and the climate favors excellent rural health.

AGRICULTURE.

Chambers County was originally forested with a dense growth of oak, pine, hickory, gum, some walnut, and a few other less important species of trees and shrubs, and little progress in clearing and cropping the land had been made prior to 1840. By this time some settlement had taken place and agriculture had become somewhat established. The open climate and free range in the forests and stream bottoms supplied the best of pasturage, and the raising of live stock early became a leading interest. The farms were in a large measure self-sustaining, until cotton began to be the main crop between 1840 and 1850. From this time on the acreage of cotton and corn increased, while that devoted to oats, rye, and wheat decreased. Cotton was produced on extensive plantations by means of slave labor, and only enough meat and corn were produced for home consumption.

As viewed to-day the system of agriculture was poorly planned and wasteful. The plowing was shallow, there was no rotation of crops, and manuring was unthought of. There naturally followed a gradual decline in the yields to a point where they were no longer profitable. The fields were then thrown out of cultivation and allowed to become reforested or to wash and gully. New ground was cleared each winter to take the place of these abandoned fields. In this way some areas in the county have been cleared three times, and are now seemingly as productive as when first cultivated.

The war brought about a change in the labor and other conditions and a new system of agriculture resulted, though these changes had little effect on the kind of crops grown or the actual methods of cultivation employed. The system developed at that time obtains at present to a large extent. Formerly the farms were self-sustaining, but with cotton and corn the staple crops to-day very little of the farm supplies are produced and too much dependence is placed

upon cotton. For the earlier labor conditions a system of tenancy has of necessity been substituted, with its concomitant credit and crop-lien evils.

In 1880, according to census statistics, 47 per cent of the farms were operated by the owners; in 1900 but 27 per cent were so operated. This shows unmistakably the growth of tenancy up to the time for which statistics were available, and there is little likelihood that the turning point has yet been reached. This spread of the tenant system is in part responsible for the slow progress in agriculture in a region naturally so well adapted to the growing of many valuable crops.

Under the usual system of tenancy, the landlord receives one-third of the cotton and one-fourth of the corn produced. Less often a cash rent of \$3 to \$5 an acre is stipulated in the lease. The acreage to be planted to cotton and corn is also generally stipulated, but as a general rule not enough corn is grown for farm consumption. In nearly all cases the landlord supplies the renters with the food and other necessities required while the crops are being grown. He also, in most instances, furnishes the work animals and farm implements. A lien on the growing cotton crops is given by the tenant as security for the supplies. A great majority of the tenants are negroes.

Cotton is the only crop that has shown a decided increase in acreage in recent years, the area planted in 1900 being 88,758 acres, about 8,000 acres more than in 1880. It is believed that there has also been an increase during the last decade. The average yield in 1880 was 137 pounds and in 1900, 175 pounds of lint cotton per acre. While seasonal differences may account for the better yield in 1900, it is probable that improved cultural methods and adaptation of soils to crops were a factor in the better showing in the latter year. Chambers County is the home of the Russell Big Boll cotton, which is very popular. The Toole and Triumph are other varieties grown. Cotton planters are beginning to give more attention to the selection of seed, which alone would cause an increase in the yield per acre.

According to the data supplied by the census of 1900, there had been little change in the acreage of corn and oats for a number of decades. It seems probable that the area in these crops is somewhat larger to-day than 10 years ago, although it is still necessary to import corn to supply the farm needs, some 100,000 bushels being required annually. The average yield of 10 bushels per acre is so low that it should be an easy matter to increase it sufficiently to make up this deficit. Upon a basis of the present acreage of 51,379 acres, this would mean an increase of only 2 bushels per acre.

Among the minor crops grown mainly for home consumption may be mentioned wheat, Irish and sweet potatoes, sugar cane, sorghum, cowpeas, and peanuts. The yield of wheat, said to have been profit-

able in past years, has now dwindled to 6 or 7 bushels per acre. Irish potatoes are not grown commercially, each farmer raising a small patch for home use. Two crops may be grown each year, but northern-grown seed must be secured for the first crop. Sweet potatoes are more generally grown. From 75 to 100 bushels per acre of Irish and from 150 to 200 bushels of sweet potatoes represent the ordinary range in the yields of these crops. The pumpkin yam is a favorite variety of sweet potato.

The lighter areas of the Cecil clay loam and heavier areas of the Cecil and Congaree sandy loam are excellently adapted to the production of Irish potatoes on a commercial scale. The product would find a ready market in near-by large cities, Atlanta and Birmingham now drawing large supplies from distant northern points. Sweet potatoes should do best on the Durham coarse sandy loam, Congaree sandy loam, and the Cecil sandy loam. A ready market is always assured and the price is rarely less than 75 cents a bushel.

Aside from these crops, the ordinary garden vegetables and fruits, such as strawberries, blackberries, collards, cabbage, turnips, rutabagas, lettuce, and spinach, do well. Tobacco for home use is produced successfully in many small patches. When grown on heavy soils it is very strong and heavy, but the lighter, sandier soils would grow a good type of filler leaf. Sugar cane gives the best results on the Congaree soils, the Durham coarse sandy loam, and the Cecil sandy loam. The sirup, which is light colored and of fine flavor, retails in the area for about 50 cents a gallon. Yields of 200 to 350 gallons per acre are easily made. The kind of soil, methods of cultivation, and especially the moisture conditions, have a marked influence on the yield and quality of the sirup.

For sugar cane the land should be deeply broken in the fall and again in spring. The after-cultivation should be very shallow, as the masses of roots lie near the surface and are easily injured when ridging is done with the Dixie or scooter plow. Cultivation should continue till late in July, and in fact every step should be taken to conserve moisture, of which this crop uses large quantities. It is customary to apply cotton seed or a complete fertilizer to the sugar-cane fields, and on the deeper sandier phases of the above types more fertilizers should be used than on the heavier types. Barnyard manure and muriate of potash are not generally used, as they are said to give a strong flavor and dark color to the sirup. The light sandy soils give lightest yields, but the highest quality of sirup.

Nearly every farmer grows a small patch of watermelons for home use. Any surplus finds a ready sale locally. Considering the excellent shipping facilities, there is no doubt that watermelons could be raised on a commercial scale.

The sandy bottoms (Congaree sandy loam) are excellently adapted to watermelon culture, and good crops are often seen on upland soils, especially the Durham coarse sandy loam. Cantaloupes are seldom grown, but would give good results wherever watermelons succeed.

Among the lesser crops that should be raised more extensively are the legumes. Peanuts are sparingly grown at present, and their culture should be encouraged. They not only furnish excellent fall pasture for the hogs, but also greatly improve the soil by addition of humus and nitrogen. Some farmers space their cotton and corn rows from 4 to 5 feet apart and grow dwarf cowpeas or peanuts between the rows. The ensuing year the cotton rows are placed where the cowpeas formerly grew. This practice has resulted in greatly increased yields. Crimson clover might also be sown between the rows at the last cultivation. Velvet beans and soy beans will be found valuable in rotation, not only as soil renovators but as pasture or for hay. The most easily raised and valuable forage crop, however, is the cowpea, and its culture is increasing each year. Cowpeas are either sown broadcast or in rows, usually between the rows of corn or cotton. They should be more often given sole possession of the land and used to form one step in a systematic rotation of crops.

A rotation embodying all the essential features has been outlined as follows: First year, corn with cowpeas or peanuts between the rows, followed by fall-sown oats. The second year after the oats are harvested cowpea hay or cowpeas and oats mixed are planted for hay or green manuring, followed by a cover crop of winter oats, rye, or vetch. The third year cotton should be planted.

Using this rotation no fertilizer will ordinarily be needed, but in case the soil be greatly depleted a mixture of acid phosphate and potash may be used. As a rule no nitrogen is needed, as the legumes have already well supplied the soil with this constituent. Even with this intensive system it has been found advisable to plant the cotton rows 5 or even 6 feet apart and to sow crimson clover or dwarf cowpeas between the rows at the last cultivation.

With the exception of the Congaree soils, all soil types in Chambers County appear markedly deficient in nitrogen. This deficiency will be supplied by the above rotation, which in addition is an important step in the control of erosion. One great weakness in the present system of soil management is that the soil lies bare and exposed for a great part of the year and is subjected to the wash of heavy rains. The effect of this on the steeper hillsides is everywhere evidenced by the loss of surface soils, deep gullies, and ruined fields.

On many farms one-tenth or more of the land has been rendered valueless because of preventable erosion. In others certain fields

which were once the Cecil sandy loam are now, or are fast becoming, the less valuable and eroded stony loam or stony sandy loam. Nearly all soils annually lose a small part of their surface materials and this is unavoidable, but any greater loss than this is usually inexcusable, for even on the steeper slopes erosion may be reduced to this minimum by careful attention to terracing and ditching, combined with deep plowing and the incorporation of humus in order to give more absorption, and by keeping the soil covered at all times by some crop. When gullies are once formed the problem becomes more difficult, but stone dams, brush, sodding with Bermuda grass, or reforesting can be employed to check the destruction, and these may ultimately bring it to an end.

Owing to the cheapness of land little attention has been given to drainage. An excess of water may render land cold and backward, and while the Cecil soils as a rule are not affected in this way, nevertheless nearly every farm has certain areas capable of improvement by ditch or tile drains. In occasional seasons of excessive rainfall, such as 1909, the year this survey was made, when crops were diminished one-third to one-half because of excess of moisture, under-drainage would amply repay the cost of construction. A growth of willows, water oak, and sedges and other coarse, innutritious grasses indicates poor drainage. Where the soil and subsoil are mottled there is likewise usually a condition of inadequate drainage. Such soils are usually cloddy, tenacious, and hard to till properly. To a great extent tillage and fertilizers on such areas are wasted. With increase in land values means will be used to put poorer areas of soil in proper physical condition.

In 1900 the farmers of Chambers County expended \$134,000 for commercial fertilizers. These consisted for the most part of low-grade mixtures, analyzing 10 per cent phosphoric acid, 2 per cent nitrogen, and 2 per cent potash. On all except the Congaree soils, which, being bottom-land types, are generally well supplied with organic matter, a mixture higher in nitrogen would give better results.

Investigations made in the Bureau of Soils have shown that the Piedmont soils contain sufficient stores of potash and phosphoric acid for all ordinary needs of crops. It has also shown, by means of wire-basket tests, that these soils all respond more readily to applications of stable manure or cowpea vines turned under green than to any of the mineral fertilizer elements or combinations of these elements. It is believed, therefore, that the farmers may save much of the cost of commercial mixtures by substituting for them the rotation of crops, green manuring, deep plowing, and thorough cultivation. Nevertheless where fertilizers are used it will be wiser to use complete mixtures rather than to depend upon one or two ingredients.

This conclusion is based upon a tabulation and analyses of the results of fertilizer experiments in growing cotton made by the different State experiment stations.¹

SOILS.

Chambers County embraces a variety of soils representing materials formed through the decay of underlying rocks, which are principally granite, gneiss, syenite, mica schist, talcose schist, quartz, diorite, and imperfectly crystalline slates of Cambrian or pre-Cambrian age. Subjected through ages to the agencies of weathering, these have given rise to soils of many varying characteristics. Since their formation in place the materials have been modified considerably in most instances through the agencies of erosion. Much material has been washed from the higher lands and deposited along the bottoms of streams as alluvial material, and this forms the most obvious change, but through the removal of finer particles in rain wash no doubt changes quite as great have taken place.

Two broad groups of soils, corresponding with distinct physiographic divisions, are found in the county, viz, upland soils and bottom-land soils. In the former are comprised members of the Cecil and Durham series; in the latter, two types belonging to the Congaree series. In the Cecil series five distinct types, ranging in texture from clay to stony sandy loam, are shown in the map. Only one member of the Durham series is found—the Durham coarse sandy loam. The Congaree is represented by the loam and the sandy loam.

The Cecil soils are the predominating upland types. They are derived from a variety of rocks, but are uniformly characterized by grayish or brownish to reddish surface soils and by red subsoils. The number of types in the series has been increased by the presence of fragments of the parent rocks, in many areas the quantity being so large as to affect the agricultural value of the land, and thus make a separation in mapping necessary. The Durham soil has a grayish surface color and a yellowish subsoil. It is derived from a coarse-grained granite presumably carrying less iron than the rocks giving the Cecil, which may account for the difference in subsoil color. Although the boundaries between the types are generally well defined, there are places where the change from one soil to another is so gradual that the lines of separation had to be placed more or less arbitrarily. Thus the Cecil clay loam and Cecil sandy loam frequently merge into one another by easy gradations. So also the Cecil stony clay occasionally passes into the stony loam or, through a gradual decrease in stone content, into the clay loam. As between series the same difficulty occurs in some cases where the Durham coarse sandy loam

¹ Whitney, Bull. 62, Bureau of Soils, U. S. Dept. of Agr.

and Cecil sandy loam come in contact, the change from the yellow subsoil of the former to the red of the latter, or vice versa, being by almost imperceptible degrees. In all such cases it was impossible to draw boundary lines with precision in mapping on a scale of 1 inch to the mile.

Most of the soils have local names, which in some cases do not correspond to the more exact classification based upon mechanical analyses. For example, in those cases where the subsoil is heavier than the surface soil the land is usually spoken of as having a "clay subsoil" or "clay bottom," although the material may really be no heavier than a sandy loam.

The following table gives a list of the several types mapped, together with the actual and relative extent of each. The distribution of the soils is shown by means of colors and symbols in the accompanying map.

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Cecil sandy loam.....	146,752	38.6	Cecil stony sandy loam.....	10,944	2.9
Cecil clay loam.....	84,864	22.3	Congaree loam.....	9,856	2.6
Congaree sandy loam.....	43,648	11.5	Louisiana slate loam.....	7,232	1.9
Cecil stony loam.....	35,392	9.3	Total.....	380,160	-----
Cecil stony clay.....	23,424	6.2			
Durham coarse sandy loam ...	18,048	4.7			

CECIL SANDY LOAM.

The soil of the typical Cecil sandy loam, to a depth of about 3 to 8 inches, is a gray to grayish-brown sandy loam. In wet places and depressions the color may be a dark gray or light brown on account of a higher content of organic matter. Some local areas are characterized by the presence of quartz and mica schist fragments, and not infrequently the content of coarse sand and fine gravel is sufficiently high to give the soil a decided coarse texture. The soil contrasts sharply with the subsoil, which consists of a red clay loam to clay carrying variable amounts of mica flakes.

Occasionally stony patches are encountered, too small to be shown on the map in their proper class, namely, the Cecil stony sandy loam. In those areas where the underlying rock approaches the surface the soil is sandier and more affected by dry weather. On slopes "gall spots," or patches of clay freshly exposed by the washing away of the sandy surface mantle, are not uncommon.

The hilly to rolling topography usually occupied by this soil favors complete surface drainage, and with the exception of occasional flat areas, where water may seep from higher areas, the sub-

soil is also well drained. On the other hand, the type is quite retentive of moisture when properly managed and is easy to improve, fertilizers having fairly lasting effects.

The Cecil sandy loam has a tendency to wash unless protected by terraces, hillside ditches, timber growth, or sod. This erosion is aided in the fields by very shallow plowing and failure to maintain a favorable content of organic matter. The areas of freshly exposed clay, or "gall spots," generally give unprofitable yields until built up by turning under organic matter, and, as a consequence of erosion, the crop-producing power of a field may vary widely in different parts.

This type is the most extensive and widely distributed soil type in the county. It is derived from the underlying mica schist, gneiss, granite, or syenite. Outcrops of granite and syenite are common, but most of the parent rocks are decayed to a depth of several feet. Much of the scattering quartz fragments found on the surface comes from the numerous veins of white quartz embedded in the underlying rock formation.

The Cecil sandy loam is an easily tilled and productive soil and most of it is under cultivation. A small proportion of it supports a growth of old-field and longleaf pine, with scattering oaks. The present cultural methods rather favor erosion and also a rapid reduction of the organic matter content of the soil, and except where a rotation of crops is practiced profitable yields can not usually be secured without the use of commercial or other fertilizers. Owing to thorough drainage the soil is warm natured and crops make a rapid and early growth. It is on this account adapted to a number of early vegetables and berries, although not extensively used for such crops. Irish and sweet potatoes, turnips, beets, beans, Lima beans, and a number of other truck crops do very well. Cotton and corn are the important crops. The present yields are 10 to 15 bushels of corn, and from one-fourth to one-third bale of cotton per acre. Oats are grown to a limited extent and from 15 to 25 bushels per acre are produced. This type when properly prepared by deep, thorough plowing and cropped under a system of rotation including some leguminous crop, such as cowpeas, vetch, and some crop to be plowed under as a source of organic matter, easily produces three-fourths to 1 bale of cotton, 25 to 45 bushels of corn, or 50 bushels of oats per acre.

The results of wire-basket tests made by the Bureau of Soils¹ indicate that an application of lime and the turning under of cowpeas was decidedly beneficial to this soil in Lee County, as was also stable manure. The use of a complete fertilizer showed good results both

¹ Soil Survey of Lee County, Ala., p. 13.

with and without lime. Nitrate of soda in these tests gave a good increase, which seems to substantiate the results obtained by many farmers who find applications of nitrogenous fertilizers of decided benefit. Under similar soil conditions in Chambers County the results of these tests should apply with equal force.

A widespread belief among farmers is that this type already has enough potash and phosphoric acid, and that none of these need be applied. The results of the previously mentioned tests made in Lee County with sulphate of potash and acid phosphate, both alone and in combination, indicate that the farmers' ideas are in the main correct.

At present land of the Cecil sandy loam type sells for \$10 to \$40 an acre, with \$25 as a fair average price.

CECIL STONY SANDY LOAM.

The interstitial soil material of the Cecil stony sandy loam consists of a grayish sand to light sandy loam about 4 to 8 inches deep. It is sandier than the Cecil sandy loam and differs from it markedly in containing a large quantity of angular yellow, gray, and brown quartz fragments, ranging from coarse gravel to fragments several pounds in weight. On steep slopes, where these are thickest, they often completely cover the surface. The change from soil to subsoil is abrupt, and at an average depth of 6 inches the material becomes a red sandy clay loam, which persists to an average depth of 36 inches. The color and texture may vary somewhat. For example, in low-lying areas it may be a yellowish red, due to imperfect drainage. Again, where the parent rock has a high quartz or mica content the subsoil may have a lighter texture. Such variations, however, cover a comparatively small proportion of the area.

The hilly surface gives rapid and thorough drainage. Steep hills and rugged topography favor erosion and the activity of washing combined with the amount of stones renders it a soil type markedly different from the more level sandy loam. The origin is the same as that of the Cecil sandy loam, the main difference being the greater proportion of quartz veins in the rocks giving rise to the stony sandy loam. This stony condition of the type is due in part also to the more rapid rate of erosion and consequent removal of the finer soil particles as they are formed.

This type was originally heavily forested with longleaf pine and some oak and hickory, and a large proportion of its area is still in second-growth timber, consisting of old-field pine, oak, persimmon, and sassafras. The largest areas are near Penton and Happyland, in the northern part of the county. Most of the type is in detached hilly areas distributed over the county.

Agricultural practice on this type differs in no marked way from that on the Cecil sandy loam. The soil is not generally desired by the farmers, and much of it has not been so long in cultivation as the sandy loam. It is easily tilled except for interference from stones and can be cultivated soon after rains. In dry seasons the moisture content is often very low. The average yields are slightly lower than on the Cecil sandy loam. Cotton gives fairly good yields with proper management. Areas not so stony as to interfere with cultivation may be used for orchard fruits, such as peaches, pears, and plums. Apples can also be grown, and figs succeed very well. Small fruits would also thrive.

Owing to the excessive tendency to erode, with the formation of steep-sided gullies most injurious to the land, the Cecil stony sandy loam should be carefully protected, using the methods mentioned in discussing other types. In most cases the present returns are unsatisfactory and an improvement in productiveness is badly needed. Control of erosion is an important step in this direction.

Increased yields are obtained through the use of composts, pine straw, lot manure, cotton seed, cotton-seed meal, or complete fertilizer mixtures. Fertilizers supplying nitrogen seem to produce most marked benefits, and since this valuable ingredient can be cheaply supplied by legumes, which are well adapted to the type, their extended cultivation is suggested.

The type sells for \$5 to \$15 an acre, depending on location, quality of timber, or farm improvements, and proportion of other types included in the farm.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Cecil stony sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
22498.....	Soil.....	7.0	19.6	17.1	24.8	11.7	10.3	9.5
22499.....	Subsoil.....	3.5	14.6	15.7	17.8	5.8	15.1	27.8

CECIL STONY LOAM.

The Cecil stony loam consists of a grayish-brown to reddish-brown heavy sandy loam to loam, with an average depth of about 6 inches. The sand is of the finer grades and varies in quantity according to the amount of erosion, it being greatest in forests never cleared and in level tracts. Strewn over the surface and mingled with the soil are found some partly decomposed granitic fragments and considerable quantities of white and yellow quartz. The subsoil below 6 inches has a uniform red color throughout, the texture becoming heavier with depth, until at 24 to 30 inches a sandy clay is reached. Both

soil and subsoil contain noticeable amounts of white mica. In irregular narrow streaks the soil may have an excess of mica, with a yellowish-red subsoil somewhat lighter in texture than typical. These limited areas are recognized by the farmers as being a lighter soil, more susceptible to drought, and more easily eroded.

The surface is rough and hilly, being a result of erosion long continued. In some places the soil was originally a sandy loam or a stony sandy loam, but erosion has left the stones resting on the heavier subsoil resulting in the Cecil stony loam. This soil has originated through the decay of various granitic rocks together with some quartz-diorite. It is located promiscuously on hills and valley slopes throughout the area. The largest bodies are on Snapper Creek, in the eastern portion of the county, and east of Bibby Ferry, in the northwestern part. At present much is in forest, and some is so hilly that if cleared it would soon become valueless because of washing.

When terraced and well manured with a complete fertilizer or plenty of organic matter good yields are reported. This type has many small drainage ways and intermittent branches, not shown on the map, which are utilized for the family supply of sugar cane, sorghum, or corn. These small strips may yield 300 gallons of a fine quality of table syrup per acre, and 25 to 30 bushels of corn. Owing to liability of late spring frosts, cotton is not generally planted on these areas, which are so well adapted to other crops. The yield and acreage of these narrow strips could be increased by straightening and deepening the stream channels. In general the drainage of the type is excellent.

Present cultural methods on this hilly type are not such as will produce the best results. Aside from an increase in absorptive capacity by deeper plowing the maintenance of terraces is absolutely necessary. At present many fields show a large percentage of red gall spots. Such washed areas will not fruit cotton nor yield a profitable crop of corn. These places should be skipped at planting time and sown to cowpeas or vetch, which could be pastured in the fall and later plowed under. With two years of such treatment profitable hoed crops could be raised. The Cecil stony loam is well adapted to corn, cotton, and oats, also to fruit on southern and western slopes. When first cleared the yields are good, but the washing and destruction of vegetable matter left by the forest soon reduce the yield to 10 or 12 bushels of corn or one-fourth bale of cotton per acre. When in forest it finds a ready sale. Cleared areas sell for \$10 to \$15 an acre.

CECIL CLAY LOAM.

The surface soil of the Cecil clay loam consists of 6 to 8 inches of a reddish-brown, mellow heavy loam to clay loam. The subsoil,

from 6 to 36 inches or more, is a red clay of uniform color. In numerous depressions the surface soil has a dark-brown appearance, owing to high content of organic material. This is also the color of recently cleared areas. The soil contains a noticeable amount of sand of the finer grades, and where not subjected to washing the surface 3 inches may be distinctly sandy. The difference in color between the darker surface and lighter red subsoil is very marked and constant. The subsoil, while somewhat plastic, has none of the characteristics of hardpan. Perfect drainage is shown by the lack of mottling in soil and subsoil. Both soil and subsoil are practically free from stones, except for a few scattered fragments of quartz diorite, hornblende gneiss, and quartz. The quantity of mica flakes is variable, the greatest amount being found in the subsoil. Any excess of this material favors erosion and gullying. An excess of iron, with poor drainage, often results in an abundance of iron concretions the size of buckshot.

This soil is locally called "mulatto" or "chocolate" land. It occupies rolling areas of small extent throughout the county. Important bodies are near Albany, Cusseta, Oak Bowery, Gold Hill, and east of Denney Ferry.

The Cecil clay loam is composed of materials derived through weathering from granite, syenite, and in rare cases from mica schist and hornblende diorite.

The virgin forest consists of longleaf pine, oaks, hickory, and walnut, with gum and water oaks along the streams. Reforested areas have some longleaf pine, but are largely covered with old-field pine, oak, persimmon, and gum. This soil was early recognized to be of great productiveness, and much of it has been cleared. Formerly the Cecil clay loam produced large crops of cotton, corn, oats, wheat, and some barley. It is still a very desirable soil and responds readily to careful culture and liberal fertilization. At present cotton yields from one-third to one-half bale, corn 10 to 20 bushels, and oats from 12 to 18 bushels per acre. Cowpeas grow luxuriantly. These yields are very low for a soil naturally so productive, and it is important that new crops be introduced and better cultural methods observed.

Clovers are not grown, the impression being general that the soil is not adapted to them. Failures to grow these crops successfully have doubtless been due to improper management rather than to lack of natural fitness in the soil. The use of lime is practically unknown. Applications of lime alone would do much to secure satisfactory stands of clover, and would in many cases be advisable or necessary. Vetch and soy beans, while not now grown, should succeed very well.

As previously noted the soil is likely to clod if plowed when too wet and is so plastic that it often does not scour well, making

cultivation difficult. To overcome this condition the use of disk plows and harrows has been resorted to with very satisfactory results. While naturally crumbly and flocculent, the soil may lose these desirable characteristics through careless handling or through loss of organic matter. Areas in this condition may be readily brought back to their original state by rotation of crops and the liberal use of green manures.

Occurring mainly in the southern and eastern portions of the county, near West Point, Denson, and Fredonia, there is a lighter phase of the type than described above. The surface soil to a depth of 5 to 7 inches is a light reddish-brown loam, tending to a sandy loam, with the sand content of the finer grades. At an average depth of 6 inches the soil changes abruptly to a dark-red loam, becoming heavier with depth until at 24 to 36 inches it is a heavy clay, containing a conspicuous amount of sharp sand and white mica flakes. The surface often shows a small quantity of quartz and granitic fragments. Mica flakes are also invariably present. The topography is rolling to moderately hilly and the drainage is good.

Because of its mellowness this phase of the type can be worked earlier than the heavier soils, thus insuring an earlier maturity of the crops. It is a favorite soil for the farmers and is adapted to a wide range of crops. Cotton yields from one-fourth to 1 bale, corn 20 bushels, and oats 15 to 25 bushels per acre. With the changes in methods suggested for other types, double the yields of corn and oats could be obtained. Near the stream bottoms sugar cane and sorghum find congenial conditions on this sandier phase of the type.

On the Cecil clay loam fertilizers of a 10-2-2 composition are commonly used with good results. Cotton seed or cotton-seed meal never fails to increase the yield. The usual custom is to apply 200 to 400 pounds of complete fertilizer, costing from \$17 to \$24 a ton. Good results have followed by making two applications of fertilizer, one-half about ten days before the crop is planted and the remainder about the time of the last cultivation. Land of this type sells for \$20 to \$60 an acre, depending on location and improvements.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Cecil clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
21316.....	Soil.....	1.7	4.3	4.2	16.1	20.1	33.0	20.8
21317.....	Subsoil.....	2.1	3.9	3.6	13.2	16.5	25.7	35.3

CECIL STONY CLAY.

The Cecil stony clay from 0 to 4 inches is a red clay of rich deep color. The surface carries a high percentage of subangular fragments of hornblende gneiss. There are also many quartz diorite fragments. Most of these rocks are so well weathered that the original structure is destroyed, although fresh crystalline surfaces with a jet-black luster sometimes are seen. In protected areas, and especially in areas covered with forest, the soil may contain enough sand to be of a loamy nature.

The subsoil to a depth of 36 inches is a very heavy deep-red clay of lighter color and heavier texture than the soil. It is very stony and on eroded slopes it is impossible to bore more than 24 inches without encountering a mass of partially disintegrated rock. Owing to the extremely high clay content the type with loss of moisture forms deep surface cracks. The fine texture enables it to hold more moisture than the coarser soils, and it withstands extremes of dryness or excess of rain much better than the lighter, sandier types.

The Cecil stony clay is distributed in scattered areas over the county, but especially in the southeast part. The largest bodies occur north of Milltown and at Boyds Tank on the Central of Georgia Railroad, and an irregular broken belt extends from north of Cusseta nearly to Denson. The type is closely associated with areas of Cecil clay loam and Cecil stony loam.

This type is derived mainly from the decomposition of quartz diorite and to a less extent from a hornblende gneiss. In many cases where there are small knolls of the stony clay surrounded by sandy soils it is very likely that the rock giving rise to the soil represents an intrusion of igneous material from great depths.

Because of its heavy plastic nature it is somewhat difficult to handle this type unless it is plowed at exactly the right moisture content. In the stonier areas the rock content may so modify the texture that an ordinary turning plow will scour even if the soil be quite wet, but this is the exception. A few farmers have disk plows and harrows which seemingly have some advantage over the ordinary implements. A hard surface crust forms after each rain and it requires frequent cultivation to maintain good tilth. The addition of organic matter will improve the texture and structure of the soil. The type responds readily to complete fertilizers, but a better result could be secured in their use if green manuring were made a part of the system of cropping. Cotton, corn, and oats do well on the Cecil stony clay. Clover succeeds and cowpeas grow luxuriantly. This is recognized as one of the strongest soils in the area. The yields average one-half bale of cotton and about 20 bushels of corn to the acre. The land sells readily for \$20 to \$40 an acre.

The following table gives the results of mechanical analyses of fine-earth samples of the soil and subsoil of this type:

Mechanical analyses of Cecil stony clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
21318.....	Soil.....	1.7	2.9	1.7	6.4	7.5	42.9	37.1
21319.....	Subsoil.....	1.2	1.8	1.0	2.8	4.2	23.5	66.0

LOUISA SLATE LOAM.

The soil of the Louisa slate loam, to an average depth of 6 inches, is a grayish-yellow to light-brown loam of rather open structure. Mica schist fragments, mica flakes, and a relatively high content of sand make the soil a friable, light loam. In limited areas there may be small quartz fragments, or flat shalelike chips of phyllite, and when there has been sufficient rainfall to wash away the finer soil, the surface appears thickly strewn with such chips usually less than an inch in diameter. In forested areas and other uneroded places, there are usually found small patches of soil approaching a sandy loam in texture.

The subsoil from 6 to 24 inches is a dull-red to red micaceous loam often containing 50 per cent or more of slatelike rock fragments. These may occur as thinly laminated pieces from a fraction of an inch to 3 inches in diameter. The interstitial soil material is often a silty clay, but the relatively large content of rock material results in a coarse, open structure. In extreme cases the subsoil may extend to a depth of 5 or 6 feet before the unweathered rock is reached, though it is generally impossible to bore to a depth of 3 feet without encountering a mass of partly weathered rock fragments. Included with this type are occasional low-lying areas having a yellow subsoil. These would have been mapped as a separate type had they not been of small extent and of irregular occurrence.

A hilly topography favors rapid surface drainage of the Louisa slate loam areas, while the fissile rock tilted at all angles allows the underground water to pass rapidly away. The drainage is thus inclined to be excessive.

The Louisa slate loam is derived through weathering from hydro-mica slates and schists. The rocks are soft and easily weathered, but vary in hardness from place to place, which in part causes the rough topography. This formation has been pierced in many places by veins of quartz, which are the source of the fragments occurring in the soil in different localities.

The Louisa slate loam is easily tilled and can be handled under a wide range of moisture content. Its gravelly nature prevents baking even when plowed in a wet condition. The surface washes badly and the fields should be kept well terraced and other means taken to prevent the loss of surface soil.

In the past the plowing has been shallow, from 2 to 3 inches deep, and the fields have been kept almost continuously in cotton, with only an occasional crop of corn. Under this system the yields have become unprofitable and the land allowed to become reforested. Where such areas have been cleared again the yields at first are apparently as large as cleared virgin areas. With the use of commercial fertilizers the ordinary yields are one-fourth bale of cotton, 10 bushels of corn, and 12 bushels of oats per acre. Better methods, including deeper plowing and a rotation of crops, will easily double these yields, as has been proved by a few more progressive planters.

In this area, as well as in the adjoining county of Tallapoosa, bush, vine, and tree fruits do well on this soil. The yields not only are good but the color and quality is high. Many varieties of grapes, pears, and apples are grown. The Elberta peach does very well, as do the Sneeds, Greensboro, and Carman. The Scuppernong grape is well adapted to the soil and climatic conditions. Of the commercial dessert sorts Moore Early and Lutie have given satisfaction. The Concord grows well, but does not ripen evenly on this soil. The Kieffer and Garber pears are best for the reason that they withstand the twig end blight most successfully. A soil rich in nitrogen causes luxuriant growth which is easily attacked by the blight. The Louisa slate loam is quite generally deficient in this element, and if care be exercised to plant trees on the washed slopes the danger from blight will be lessened. The same precaution should be used in growing the Yellow Transparent apple. The Yates, Shockley, and Carolina June have proved good apple varieties for this type.

The Louisa slate loam is sparingly developed in the northwestern part of the county, where it sells for \$10 to \$20 an acre, depending on improvements and state of cultivation.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Louisa slate loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
21587.....	Soil.....	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
21588.....	Subsoil.....	3.4	10.4	8.4	23.9	12.6	27.2	13.7
		2.7	8.9	7.7	18.3	10.0	25.0	27.0

DURHAM COARSE SANDY LOAM.

The Durham coarse sandy loam consists of 5 to 10 inches of incoherent rather coarse angular sand to light coarse sandy loam, gray in color, resting on a subsoil of bright yellow sandy loam which becomes slightly heavier with depth and is somewhat plastic when wet. A small quantity of angular quartz fragments occurs in this soil, but there is never enough to interfere with cultivation. The sand in the subsoil is finer than in the surface soil. Narrow areas bordering streams may have a grayish or even bluish subsoil, a condition due to imperfect drainage. Again, small knolls of 1 acre to 5 acres in extent may have a reddish subsoil. Where of sufficient extent to be shown on a scale of 1 inch to the mile such areas are mapped as Cecil sandy loam.

The Durham coarse sandy loam is found in scattering patches mainly in the northern half of the county, the largest areas being near Pleasant Grove. It occupies high rolling country, and is moderately eroded. It is well drained. Because of its sandy nature it usually suffers from drought, except in seasons of abundant rainfall. Those areas lying near drainage have better moisture conditions than most of the type.

Originally the Durham coarse sandy loam was forested, mainly with longleaf pine and several species of oak. There is still much pine standing. Cut-over lands are covered with a scrubby growth, mainly oak.

In consequence of its loose sandy nature this soil is not well adapted to cotton or corn, though these are at present the main crops. Where erosion is active it brings the yellow subsoil to or near the surface and such areas with continued tillage and fertilization become more productive than the sandier phase of the type. In many places the Durham coarse sandy loam changes into the Cecil sandy loam by easy gradations, so that the boundaries shown are necessarily more or less arbitrary.

The rocks giving rise to this type were not always easy of determination, because of the deep covering of soil. This was especially the case in the small isolated areas. Occasionally the soil has been entirely washed away for a space of one-half acre to 5 acres, leaving exposed the bare dark-brown syenite rock, known as "bald rock."

Plowing is shallow and the main effort in cultivation is to destroy weeds. No thought is given to frequent shallow cultivation as a means of conserving moisture, and consequently the soil's natural tendency to drought is increased and small crops are the result. Early quick-growing spring vegetables should give better results than the staples now grown. Whatever the crop is, it needs heavy fertilization. Crop rotations designed primarily to increase the

organic content of the soil will be found to give more marked results than any one change in the methods of cultivation now employed by the great majority of the farmers. At present the yields are extremely low, probably rarely exceeding one-fifth of a bale of cotton or 5 to 8 bushels of corn per acre.

On account of its low productiveness the type is valued mainly for its timber, bringing from \$5 to \$10 an acre. It would seem that much of its area should be devoted to forestry, especially in the production of longleaf pine, which apparently finds congenial conditions in the open, well-aerated soil, the lack of moisture being of less moment to trees which can send their roots deep into the subsoil than to cultivated crops which are more restricted in their root development.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Durham coarse sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
21816.....	Soil.....	7.6	27.4	14.0	22.1	6.2	15.7	6.9
21817.....	Subsoil.....	11.0	19.7	9.5	15.5	3.5	18.8	21.3

CONGAREE LOAM.

The surface soil of the Congaree loam, to a depth of 6 to 12 inches, is a grayish-brown to reddish-brown heavy silty loam, having dark-brown mottlings. The texture is in general uniform, but may vary along slopes where slight admixtures of colluvial material have taken place or where materials have been brought in by tributaries of the main stream, whose flood plain the type represents.

The subsoil ranges from a brownish-yellow silt loam to a reddish-brown loam or sandy loam, sometimes mottled. Near Denney Ferry, on the east side of the Tallapoosa River, there is a small area with a brown micaceous soil and a brown silt loam subsoil, which has a greasy feel, due to the relatively large content of mica.

Soil of this type occupies flat stream bottoms and is largely overflowed each year. It is derived from the deposition of material carried by streams flowing through the heavier members of the Cecil series. It is sparingly developed, as the currents are usually swift enough to carry much of the fine material to lower levels. The soil often changes suddenly to the Congaree sandy loam, with which it is closely associated. On High Pine Creek, south of Abanda, the largest and most typical area is found. At present the type is mainly wooded or in pasture supporting a rank growth of sedges and aquatic grasses.

Although as a rule it is not well drained, some areas have been reclaimed and brought to a state of high productiveness. Corn, the leading crop, yields an average of 30 bushels per acre. The soil is also well adapted to sorghum, oats, and sugar cane, the latter giving a light-colored syrup of excellent quality. There is some risk in growing cotton, which may be injured by late frosts. Vegetables do well.

The present conditions of this valuable soil render it susceptible of great improvement. Wherever the stream channels have been deepened and straightened a marked benefit has accrued to the adjacent areas. The laying of tile or plank laterals leading into open ditches with gently sloping sides is recommended. The limited extent of the type, together with the fact that it is always sold in connection with other types, makes an estimate of its present cash value improbable.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Congaree loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
21314.....	Soil.....	0.7	2.2	2.6	14.7	12.1	48.0	19.4
21315.....	Subsoil.....	.3	2.3	2.4	17.3	13.6	33.0	25.8

CONGAREE SANDY LOAM.

The surface soil of the Congaree sandy loam is variable, ranging from a grayish-brown to reddish-brown sand or light sandy loam. The average depth of the material is 10 inches, where it changes to a dark-gray, brown, or reddish-brown sandy loam, often mottled with brown or yellow. At 36 inches the subsoil usually becomes heavier, although there may be considerable variations in the deeper material. In very wet areas the subsoil may have a bluish shade, mottled with yellow or brown. The subsoil may also show layers of sand or sandy loam alternating with loam or silt loam.

The Congaree sandy loam is for the most part derived from material deposited by streams, though there is generally bordering the uplands a narrow strip of colluvial material washed from the adjacent slope.

In addition to the areas mapped there are many areas along intermittent branches and incipient drainage ways which are narrow and too small to be mapped accurately. On the whole, the soil has a wide distribution, there being few farms on which it does not occur.

Because of the ease of cultivation, great productiveness, and freedom from crop failure the Congaree sandy loam has always been highly esteemed. It is, however, the lowest lying type in the area and is subject to late spring and early fall frosts. This condition, together with the fact that the plants grow too rank, do not boll freely, and may fail to ripen a top crop, prohibits the extensive use of the soil for cotton. It is well adapted to corn, sugar cane, sorghum, and oats. Where corn is grown for several successive seasons the yield declines and there is need of a systematic crop rotation. The growth of a single crop of oats has often brought the land to a point where the succeeding crops of corn are as large as formerly. In addition to the above crops, the Congaree sandy loam is well adapted to market garden products. During the fall the sandier areas, usually found in bends of the streams, may suffer from drought. As a general rule, however, there is a plentiful supply of moisture and differences in texture are not of as much importance in their relation to crops as in the case of upland soils. The sandiest areas are best adapted to watermelons, cantaloupes, sweet potatoes, and peanuts. On these areas fertilizers are necessary. Judging by the stunted, yellow growth of corn on this phase, a fertilizer high in nitrogen should be used. On the greater part of the soil fertilization is necessary. If cotton is grown, liberal applications of acid phosphate will increase the fruiting and hasten maturity. In one case irrigation has been practiced, a yield of nearly 80 bushels of corn per acre being secured.

Although this is a strong fertile soil it is not at present in good condition. Some of it is waste land, being cut by crooked stream channels and covered by a rank growth of weeds and trees. Occasionally areas of this character have been cleared and the stream courses straightened. Digging wide open ditches with gently sloping sides and leading tile laterals into these will greatly improve many areas which are now nonagricultural land.

Corn yields an average of 30 bushels, oats 20 to 35 bushels, and sugar cane 300 gallons of sirup per acre. Only limited areas of this soil are included in the farms, and, being sold in connection with other soils, it is difficult to state the price. It is, however, considered one of the most valuable soils in the county.

SUMMARY.

Chambers County lies in the eastern part of Alabama, along the Georgia line. It lies in the extreme southern portion of the Piedmont Plateau and has a range in elevation from 500 to 885 feet, with an average probably between 700 and 750 feet above sea level. The topography varies from rolling to very hilly.

Drainage is afforded by the Tallapoosa and Chattahoochee rivers, the latter a navigable stream. The drainage of the county on the whole is very good.

Transportation facilities are excellent, no part of the county being more than 10 miles distant from a railroad. The wagon roads are mainly unimproved, although abundant road material is readily accessible.

The climate is exceptionally mild, with rainfall ample and well distributed, and favorable to a wide variety of staple and special farm crops. A long growing season of 233 days allows the harvesting of two or more crops on the same field in one season.

The citizens are composed largely of native whites and negroes. According to the census of 1910 the county has a population of 36,056. Labor is supplied chiefly by the colored race. Wages range from 60 cents to \$1 a day, or \$12 to \$15 a month, with board.

The county is well supplied with schools, and has rural free delivery and telephone service. One-fourth of the farms are operated by owners; the balance by tenants. Land values are increasing.

Cotton and corn are the chief products, and the agriculture is based upon the one-crop system.

The soils range from sandy loams to very heavy clays. They are residual, derived from the underlying rocks of the Piedmont Plateau, or alluvial, representing degradation products of these rocks reworked and deposited by the streams.

The residual soils, which occupy the uplands, comprise members of the Cecil and Durham series. The Cecil stony clay and Cecil clay loam are well adapted to the growing of cotton and corn and other general farm crops. They should be used for these crops under a proper system of rotation.

The Cecil stony sandy loam, Cecil sandy loam, and Louisa slate loam are well adapted to peaches, early apples, pears, figs, and to scuppernong and other grapes suited to the climate. There is the same need for rotation and diversification of crops as in case of the types already mentioned.

The Durham coarse sandy loam is especially adapted to peanuts and watermelons and other crops liking a light-textured soil. It can be used for certain staple crops by proper management.

The alluvial soils are included in the Congaree series. They are of small extent, but so widely distributed that nearly every farm contains enough to produce the home supply of corn, sugar cane, and vegetables. In many cases a profitable trucking industry could be built up on these soils.

The pasturing of hogs, goats, and sheep would be highly profitable on the extensive areas of land which are at present nonagricultural.

There is general need for the introduction of systematic crop rotations and the diversification of farm products in order to restore the soils to their original productiveness, which has declined mainly through loss of organic matter. In this connection the importance of winter cover crops can not be overestimated.

The percentage of waste land occupied by scrubby undergrowth, meandering streams, and gullies is on the increase. Active steps should be at once taken to protect the fields from erosion—the chief cause of the increase. At present at least one-sixth of the county can be classed as unproductive soil.

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